Space Weather Forecast

Issued on Friday, 29 March 2024 at 12:51 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Further Moderate flares expected from large sunspot region (R1-R2 Blackouts). Chance of Strong flares (R3+ Blackouts). Activity easing day 4 (01 Apr).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High with one Strong flare and two Moderate flares observed from the large sunspot, now nearing the southwest limb. This is a very large and relatively complex region that is now becoming difficult to see for analysis. However development appears ongoing with the trailer spot with some mixed magnetic polarities. There are four sunspot regions on the visible disc, all in the western hemisphere, however the other regions are all small and simple unipolar spots.

The Strong flare produced a very weak and slow coronal mass ejection (CME) that has been assessed as missing Earth. A further CME was also observed from one of the Moderate flares, and while assessment is still ongoing, this is also currently expected to miss Earth. No other Earth-directed eruptions have been observed.

Solar Wind / Geomagnetic Activity: The solar wind was indicative of ongoing ambient slow wind conditions. Winds speeds eased from slightly elevated, around 430km/s to background 360 km/s. Interplanetary Magnetic Field was weak, with its north-south component also only varying weakly. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) continued to be slightly above background and declining, and well below Radiation Storm levels. This is due to the ongoing effects of the Moderate Radiation Storm that peaked on 24 Mar.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High activity with further Moderate class flares expected, and a chance of isolated Strong class flares from the large sunspot region on the disc. This risk recedes later in the period, as the region moves onto the far-side later day 2 (30 Mar), although any notable flares will potentially remain observable into day 4 (01 Apr).

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. Background winds at first have the potential to become slightly enhanced day 3 (31 Mar) from the arrival of any fast wind from a small coronal hole. Any connection to this feature is expected to be limited however. Mainly Quiet geomagnetic activity is forecast, with a chance of Unsettled, and a slight chance of Active with the onset of the faster solar winds.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to continue easing to background, with a slight chance of a further enhancement above the S1 Minor Radiation storm level given any notable flares from the large sunspot on disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	70	60	30
Very Active	R3 to R5 X	Yes	30	30	20	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	5	5	5	5

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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